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AUTHOR Harvancik, Mark J.; Golsan,Gordon
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ABSTRACT

The scores from the Graduate Record Examination (GRE) have been used by graduate admissions committees in selecting graduate candidates. A study was undertaken to examine the predictive validity of the GRE in conjunction with measures of achievement. Records of 619 Masters Degree graduates at a small southwestern college were obtained, including Masters Degree received; undergraduate grade point average (GPA); graduate grade point average (GGPA); verbal, qualitative, and total scores from the GRE; and sememster of graduation. A statistical analysis was conducted to determine the Pearson Product-Moment correlation coefficients indicating the extent of relationships between GPA, GGPA, GRE-Verbal, GRE-Qualitative, and GRE-total scores. The results indicated that in all instances Pearson Product-Moment correlation coefficients were statistically significant. In correlational studies, a clear understanding of correlational analysis and characteristics of variables is critical. Correlation coefficients may be affected by sample size, combining of groups, restriction of range, and consistency among coefficients. The findings from this and other studies have demonstrated that there is a statistically significant relationship between measures of achievement and GRE scores. If admissions committees wish to use GRE as more than an objective cutoff, however, more comprehensive research is needed. (NB)

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Graduate Record Examination Scores and Grade Point Averages: Is there a Relationship?

Mark J. Harvancik

Gordon Golsan

Adams State College

CG 019136

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Abstract

The present study is an examination of the predictive validity of the Graduate Record Examination (GRE) in conjunction with measures of achievement. The records of 619 Masters Degree graduates at a small southwestern college were analyzed to determine the relationship between grade point average and scores on the GRE. The results of the analyses indicated that in all instances Pearson Product-Moment correlation coefficients were statistically significant. Also, the importance of the relationships in question will be discussed and whether statistical significance is a sufficient criteria for importance.

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Graduate Record Examination Scores and Grade Point Averages: Is there a Relationship?

The scores from the Graduate Record Examination (GRE) have been used by graduate admissions committees for quite some time in making determinations of graduate candidates. Other criteria, such as undergraduate grade point averages (GPA), recommendations, and experiences, also weigh in the admittance decisions, though disagreement surrounds the validity of GRE scores as predictors of graduate school success. Dole and Baggaley (1979) found that the correlation between GPA and GRE scores were r=.04 for the GRE-V and r=-.01 for the GRE-Q scores, and the correlations between graduate grade point averages (GGPA) and GRE scores were r=.14 for the GRE-V and r=.11 for the GRE-Q scores. In this study N varies from 42 to 61 and in all instances correlations were not statistically significant. Hosford, Johnson, and Atkinson (1984) found that the correlation coefficients between academic success, GGPA, and GRE scores were r=.35 for the GRE-V (p<.01) and r=.10 for the GRE-Q scores. In the case of the GRE-V/GGPA coefficient (N=53), a statistically significant correlation was found. Finally, Herbert and Holmes (1979) found correlations of r=.348 (p<.005) between GRE-V scores and GGPA, and r=.342 (p<.005)

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between GRE-T scores and GGPA. The correlation between GRE-Q scores and GGPA was not significant. The coefficients for both GRE-V/GGPA and GRE-T/GGPA were statistically significant (N=67).

On examination of these results it is important to realize the difference between statistically significant correlations and significant relationships between variables in question. The strongest relationship reported above ($r=.35$, $p<.01$) yields a coefficient of determination of $r=.1225$. The implication is that 12.25% of the variation in variable #1 (academic success) is a function of variable #2 (GRE-V scores) or vice versa. Therefore 87.75% of the variation between these variables are left to chance.

Results such as those mentioned above have provided fuel for debate of the issue as to whether GRE scores are appropriate predictors of graduate school success. The purpose of the present study is to provide data with the hopes of further clarifying the role of GRE scores in admittance decisions. Integral to this goal is a clear understanding of statistical and sampling issues unique to this particular topic.

Method

Participants Participants for this study were graduate students attending a small southwestern college who

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completed their Masters Degrees during one of 16 consecutive semesters from the summer session of 1979 through the summer session of 1984. The population (N=619) consisted of 386 females and 233 males. Finally, specific areas of concentration of participants included education, guidance and counseling, and liberal arts.

Procedure The data for the 16 semesters was obtained through the Office of Graduate Studies in which official records were examined for the needed information. The Masters Degree received, undergraduate grade point average (GPA), graduate grade point average (GGPA), and verbal, quantitative, and total scores from the GRE, as well as the semester of graduation, were recorded. A statistical analysis was then conducted to determine the Pearson Product-Moment correlation coefficients indicating the extent of relationships between GPA, GGPA, GRE-Verbal, GRE-Quantitative, and GRE-Total scores.

Results

Table 1 contains the Pearson Product-Moment correlation coefficients obtained from the data mentioned previously. The results indicate that in all instances the correlation coefficients were statistically significant ($p<.05$). Table 1

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also indicates the coefficients of determination, ranges, and means for the data.

Table 1

Comparison of GPA, GGPA, and GRE scores

(correlation coefficient/coefficient of determination)

	GGPA	GRE-V	GRE-Q	GRE-T
GPA	**.269/.072	*.251/.063	*.199/.040	**.254/.065
GGPA	-	**.341/.116	**.323/.104	**.377/.142
Mean	3.73	434.1	419.3	853.4
Range	2.74-4.00	200-740	200-770	410-1470

*p<.05
**p<.01

Discussion

On examination of the Pearson Product-Moment correlation coefficients, there is no doubt as to the statistical significance. The next step is to determine the importance of the relationship among variables in question. Table 1 indicates that the shared variation among variables based on the coefficient of determination ranges from .040-.142. The implication is that with these results we are able to account for 4%-14.2% of the variation shared by variables in question. Conversely, we know that 85.8%-96% of the variation shared by variables in question is left to chance. Based on this information alone one could become

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rather skeptical as to the utility of GRE scores in association with measures of achievement as predictors of academic success. This is indeed a valid concern and many opponents to the using of GRE scores in admittance decisions rally around this point.

A primary concern of those individuals who undertake research as well as those who utilize research findings, is an adequate understanding of the statistical nature of the study in question. In the present situation a clear understanding of correlational analysis as well as characteristics of the variables in question are critical. Lindeman and Merenda (1980) have provided various factors which may affect correlation coefficients. These include: sample size; combining of groups; restriction of range; and, consistency among coefficients. The discussion will now turn to a more detailed examination of these issues as they apply to the present study.

Regardless of the type of research undertaken, sample size can have an impact on the applicability of the findings. In the case of correlational studies, it is recommended that the sample size be equal to or greater then n=100. The present study does satisfy this criteria, whereas the studies cited in the introduction do not (n=42-67). It should also be pointed out that in the

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present study each of the 16 semesters included failed to reach the n=100 criteria (n=3-93). Therefore, increasing sample size may in fact be an area of focus in further research of this nature.

The second issue pertains to the combining of groups. In the case of research on GRE scores there is a tendency to combine data across a variety of degree programs. This was the case in the present study. The process of combining data negates differences in degree programs and the particular standards of that program. A clearer approach might be to conduct analyses on individual programs over a number of years. If a graduate admissions committee is selecting candidates for an educational psychology program for example, then it would seem to make sense that they use research based on educational psychology programs.

The third issue, restriction of range, is a critical issue particularly in the case of GRE scores in relation to graduate school success. Many of the research studies exploring this issue, as is the case with the present study, are conducted using individuals having already been accepted into graduate programs. Regardless of the program it should be clear that both the range of GPA's and GRE scores for these individuals tend to be rather limited. One would expect that students accepted into a graduate program would have, and continue to maintain, GPS's in the 3.00 to 4.00

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range and would have GRE-Total (V and Quant.) scores in the range 1050-1200. This clearly is not representative of the entire range of possible scores. It is strongly suggested that research be undertaken in which a full range of individuals be included, those pursuing advanced degrees as well as those who do not intend to pursue further formal education.

A final issue of concern pertains to the consistency of coefficients. The responsibility of all researchers is to have a clear understanding of previous research and literature pertinent to the subject under investigation. A particular concern is whether the statistical results parallel that of research already conducted. When this is the case, the researcher has stronger support for his/her hypotheses and either strengthens or weakens the case in question. In the present situation the results appear to parallel research already conducted to the extent that correlation coefficients are similar in terms of sign and magnitude and for the most part are statistically significant.

In conclusion, it is clear from the results of this and other studies that there exists a statistically significant relationship between measures of achievement and GRE scores. Based on the coefficients of determination obtained and compared to those resulting from other studies, shared

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variation between variables is not a myth. What is left to future researchers in this area is to determine whether more variation is shared between variables in question. For this to occur issues such as those mentioned earlier must be addressed. If admissions committees wish to use the GRE in a manner other then simply as an objective cutoff, then more comprehensive research must be undertaken.

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